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ABSTRACT

This paper addresses 11 commonly asked educational policy questions by referring to National Assessment of Educational Progress (NAEP) findings in five learning areas. The paper is organized for quick reference to the 63 findings, which are, in turn, indexed to the NAEP reports in which they originally appeared. Findings in reading, literature, mathematics, writing and science are described and interpreted with a view toward encouraging others to include assessment data more frequently in educational policy discussions. The primary audience for the paper is busy education leaders who do not have the time to read the full NAEP reports and can profit from a short overview within a policy framework. Primary type of information provided by the report: results (Summary) (Utilization). (Author)

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**NATIONAL ASSESSMENT FINDINGS
AND EDUCATIONAL POLICY QUESTIONS**

No. SY-CA-50

**an exploratory paper by
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December 1982

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The National Assessment of Educational Progress is an education research project mandated by Congress to collect and report data, over time, on the performance of young Americans in various learning areas. National Assessment makes available information on assessment procedures and materials to state and local education agencies and others.

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PREFACE

Since the National Assessment began in the late sixties, considerable energy has been devoted to methodological and technical aspects of assessment design, item development, sampling procedures and analytic strategies. During the seventies, many states created their own assessments and turned to NAEP for technical advice, assessment materials and networks such as the Large Scale Assessment Conference, where they could share technical concerns and expertise. Procedural and methodological matters understandably overshadowed utility questions until only a few years ago. But questions about how NAEP information -- or any assessment information -- is used or might be used by a variety of education actors and decision makers have grown increasingly pressing as the project's importance and visibility have grown.

Of particular interest -- because it affects school participation in the assessment and participation affects the accuracy of assessment results -- has been the utility of NAEP results for schools and school districts. How can national and regional data -- necessarily abstract and removed from day-to-day realities of any particular school -- have any significant impact upon classroom practices?

This special study addresses that question. Unlike other special studies (e.g., "Students from Homes in Which a Language Other Than English Dominates"), this paper does not showcase a secondary analysis of NAEP data. Rather, it represents a "repackaging" of existing data to answer some common questions about educational achievement, to relate the findings to past and future educational policy decisions and to raise questions for future research efforts.

The purpose of the paper is to provide a busy education leader with a "skeleton key" to the NAEP data base: a short overview of intriguing findings organized around topics likely to come up in speeches, articles or briefings. The arbitrary selection of findings and the interpretive judgments about them are the responsibility of the author only. Readers are encouraged to form their own opinions about the significance of these findings and are given specific references to the reports from which the findings derive, in case they want to pursue something to a deeper level of detail. We expect this paper to grow as additional findings are offered by other readers.

Many of the answers to questions and the recommendations for action in this paper could be buttressed through reference to research findings about learning in reading, writing, mathematics and science, as well as research on effective teaching and effective schools. As a next step, we will be indexing findings and interpretations to appropriate research, looking for convergence and divergence of views. Having done that, we intend to extrapolate those findings of greatest utility to two policy

groups with great influence upon the classroom: curriculum guide writers and textbook selectors. We have already begun to learn exactly how and when each group uses various kinds of information, and we will be working with them during 1983 to perfect a model that satisfies their needs.

In the meantime, here is a paper that offers easy access to a huge data base, some food for thought and some recommendations for action. We invite reader response and welcome any insights or observations that would improve the effectiveness of this kind of effort.

Beverly Anderson
Director
National Assessment of
Educational Progress

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NATIONAL ASSESSMENT FINDINGS AND EDUCATIONAL POLICY QUESTIONS

This paper is intended to provide a bird's eye view of the National Assessment of Educational Progress's (NAEP) huge data base and to stimulate some thought about what 13 years of data collected about over 1,000,000 students can tell us about American education. From the thousands and thousands of assessment results already published, we have selected 63 findings from five assessment areas. We could have selected many more findings from all 10 areas and the four probes NAEP has administered, but the purpose of this paper is not to be comprehensive. The paper is meant to illustrate the fact that long-term assessment findings constitute a rich source of information, ideas and hypotheses about what is happening in American education. They should be used more widely than they are, especially in policy analysis and debate about the quality and the future of our educational system.

Readers can procede in one of two ways. They can read the discussion part of this paper, which follows immediately, and then examine the findings referred to throughout the discussion. Or, they can peruse the findings first and then come back and read the discussion. Since the paper is designed to facilitate speech writing or quick review for a briefing, it makes no difference which way the reader procedes.

The discussion section is organized around questions which staff at the Assessment and the Education Commission of the States (ECS) have often been asked. Readers may think of other questions, of course, and the findings may help answer them. Note that each finding is indexed to the report in which it appeared so that anyone interested in getting deeper into the data can easily do so. We would suggest that articles written about these findings be based upon the original publications instead of this overview, since the original publications contain all the appropriate methodological information and caveats.

The discussion here is by no means definitive. These are one writer's judgments, hunches and educated guesses, and readers will have to decide for themselves whether they make sense. They are offered in the interest of starting a dialogue that includes, as a key feature, interpretive use of assessment data. The paper will grow as we add to the data base, index findings to other research studies and gather feedback from readers with many different perspectives on education. And as it grows, we intend to package and repackage the data to address very specific policy activities such as selecting textbooks or creating curriculum guidelines.

QUESTIONS

"Do National Assessment data shed any light on the effectiveness of federal or state educational policy during the seventies?"

Many of NAEP's findings separately and collectively suggest that federal and state equal educational opportunity policies, reading programs such as Right to Read and federal/state programs concentrating upon elementary education may well have had a positive impact upon student achievement. Consider the following points:

- Black students' performance improved over the decade at a faster rate than white students in reading, writing and mathematics (findings 1, 4, 17, 46).
- Reading performance remained relatively stable over the decade for teenagers and showed an improvement for 9-year-olds (findings 1, 3, 6).
- While reading remained stable, there were declines among teenagers in science and mathematics (findings 1, 3, 6, 42, 43, 55, 56, 57).
- Elementary students showed progress on language arts assessments, while older students did not (findings 1, 3, 6, 14-16).

Given the facts that, during the sixties and seventies black students were special policy targets, reading programs received more attention and resources than other programs and elementary schools were the primary beneficiaries of Title I and other monies, NAEP data provide strong circumstantial evidence that focused policy attention and focused resources may have had measurable impact upon educational achievement. At the very least, one can observe that the target groups and areas of federal policy did not show declines, whereas groups and areas ignored or downplayed by federal and state policies did show declines.

"Was there a need during the seventies to go back to the basics?"

National Assessment results suggest that, in general, the vast majority of students had mastered the basics, i.e., low-level reading, writing and arithmetic skills, even before the "back to the basics" movement (Brown 1981). In addition, many of the findings listed here indicate stability or progress through the seventies (especially the late seventies) in literal comprehension, writing mechanics and computational skills (findings 1, 3, 6, 18, 45). To be sure, there were always students with problems in the basics (see 20, 30-34), but the NAEP

data do not support the claim that there was some new problem between 1969 and 1980 that required schools to go "back to the basics."

"If students were not doing badly on the basics, why were test scores going down throughout the seventies?"

Many, but not all, test scores were declining during the seventies, but the phenomenon was not necessarily caused by problems with the basic skills. In fact, findings 3, 6, 15, 16, 35-37, 44, 45 and 55-57 all point to problems with higher-order skills such as inference, analysis, interpretation or problem solving. Post hoc analyses of the Scholastic Aptitude Test (SAT) reveal that the greatest declines in that test also occurred among the items testing higher-level skills and state assessments (e.g., Illinois) have been finding the same pattern.

"What kinds of students accounted for the declines and improvements during the seventies?"

We have already noted that black students and some disadvantaged groups of students improved during the decade (e.g., finding 1). In addition, findings 2, 8, 9, 47 and 58 establish that the improvements were largely among the students in the lowest achievement class -- that is, those students who constitute the lowest 25 percent of the students in each assessment.

On the other hand, the largest declines occurred in the highest achievement class -- that is, among the best students in each assessment.

"What is the level of literacy in America today?"

It would appear from the reading and writing findings, and from NAEP's functional literacy assessments in the mid-seventies (NAEP 1976) that the vast majority of America's students are literate readers (close to 90 percent) and literate writers (probably close to 75 percent). However, the fact that declines have occurred in inferential comprehension and in more difficult writing tasks should be cause for concern. It would appear that a standard of literacy which was perfectly acceptable to 15 years ago is rapidly becoming obsolete. To the extent that analytic, interpretive and evaluative literacy skills are increasingly demanded by an "Information Society," NAEP findings suggest that there is a growing illiteracy (see Gisi, Forbes 1982).

"Are bilingual programs helpful to students who are not literate in English?"

National Assessment findings do not bear directly on the efficacy of bilingual programs, but two studies provide some data which, in conjunction with other data, may help answer this question. Finding 1 indicates that Hispanic 9-year-olds improved

faster than the nation as a whole during the seventies. We do not know if this was a consequence of bilingual programs, but we do know that the gain was 8.4 percentage points for Hispanic students in big city schools where perhaps there is more likelihood of exposure to bilingual programs.

Findings 10-12 suggest both positive and negative implications for bilingual programs of any kind (as opposed to those exclusively for Hispanics). These findings suggest that coming from a home in which a language other than English dominates:

- Is, in general, associated with lower reading performance.
- Is less associated with poor reading performance for students who are attending advantaged schools and come from homes rich in reading materials.
- Is associated with different age-to-age patterns for white, black and Hispanic students.

Thus, it would appear that home and school resources can make a difference in the reading performance of students from non-English-speaking families. On the other hand, there are clearly limits to what can be accomplished, especially when the language barrier is also accompanied by factors which generally tend to make students subjects of various kinds of discrimination: poverty, race or the necessity to attend schools with few resources.

"How well can America's students read, write and compute?"

Although NAEP findings are descriptive, not evaluative, NAEP has asked many professionals to interpret the findings qualitatively. A reading of the interpretive chapters of the reports upon which this paper rests reveals a general level of disappointment among these learning area professionals. Reading educators expressed pleasure at the general stability of results and the elementary school improvements, but were disappointed to see inferential comprehension decline. Writing educators were also pleased that changes were not as dramatic as the press and public believed, but they felt performance on many writing tasks was lower than they would expect it to be. Interpreters of the literature assessment felt that performance on analytic, interpretive and evaluative tasks was far lower than they would like to see. Mathematics educators testified in the U.S. Congress that they felt the results for word problems and problem-solving exercises were much too low. And science educators felt that, although the rise in performance on biology exercises was commendable, those exercises were the easiest. They were distressed to see the physical science exercise results continue downward.

These were the opinions of only a few people, of course, and they were tempered by very positive statements about improvements in some areas and for some students. But, in general the educators, who may have had higher educational standards and ideals than most people, felt student achievement -- particularly in high school -- could and should be improved.

"Will minimum competency tests raise student achievement?"

As political or public relations tools or as catalysts for renewed commitment, greater cooperation among teachers and administrators or clearer goal definition, minimum competency tests might conceivably improve student achievement. However, the foregoing discussion should have made it clear by now that the problems are not so much with minimum competencies as they are with maximum competencies. This being the case, focusing of energy upon the teaching and testing of low-level skills is not likely to have any effect upon the more serious problems suggested by NAEP data. Indeed, such a focusing might exacerbate the problem even more by ignoring the higher skills and the need to challenge all students.

"What factors that we can do something about seem most likely to influence these performance trends?"

Whenever we see a decline in the level at which students are performing some skill or set of skills, the number one hypothesis for the decline should be that the skill or set of skills is not being taught. Findings 22-26 suggest that very little writing is going on in the schools and there is very little comprehensive writing instruction available. It is reasonable to suppose that improved training of teachers and an increase in the amount of writing required of students would bring about a noticeable improvement in writing performance.

The same principle applies to the other areas as well. Declines in analytic skills (finding 36) suggest that students get few opportunities to practice them. Many of the literature results (35-40) can be explained in terms of standard classroom practice, which emphasizes brief oral comments from students rather than sustained inquiry or written analysis. Findings 27 and 29 suggest that students read for only short bursts of time; findings 33 and 34 suggest that many teenagers are in the habit of not finishing what they read; finding 29 suggests that a lot of time that could be spent reading is spent watching television.

Another factor that appears to influence performance is homework. Finding 13 demonstrates that students who are doing homework perform better than those who are not.

What these and many other NAEP and research findings add up to is this: if teachers are well prepared and if students are exposed to certain skills and spend time practicing them,

performance improves. We know that, during the seventies, considerable time and resources were devoted to improving elementary students' reading skills and the results reflect a payoff. We know that far less time and fewer resources were devoted to mathematics and science, and the results reflect the natural consequences of that situation as well.

Beyond these general, easy to control factors, there are a number of specific suggestions for teachers in NAEP reports and many more could be culled from the professional literature. Some outstanding ones:

Reading and Literature

- Stress inferential as well as literal comprehension skills.
- Cultivate interest in reading that will get students reading and keep them reading for longer periods of time.
- Make students write about what they read.
- Encourage students to make more than quick, superficial responses to their reading.
- Don't do all the hard thinking for the students. Let them do it. Some studies suggest that many writing teachers make the hard organizational and structural decisions for their students, leaving the students to "fill in blanks."

Writing

- Have students write.
- Make students write in a variety of discourse modes (e.g., persuasion, description, etc.) and for a variety of audiences.
- Recognize that grammar and correcting errors are only two aspects of writing and should not be overstressed. (Note findings 18 and 19, for instance: errors in usage and mechanics stayed the same through the decade, but some writing skills declined anyway.)
- Provide prewriting training, and oral and written feedback on papers.
- Require students to rewrite papers once they have been fully diagnosed.

Mathematics and Science

- Take advantage of calculators as devices students can use to check their work and as handy teaching tools.
- Do not wait until students have mastered computation skills before going on to problem solving. Both can be taught at the same time.
- Give students the opportunity to interact with one another in exploratory projects (see finding 54).
- Take advantage of the good will students have toward both science and mathematics (findings 49-53, 62).

Each of these general teaching recommendations can be fleshed out in much more detail and all have been tied to very specific "how to's" in various publications for educators in all these areas.

Having established a list of "how to's" for teachers, it is necessary to establish the conditions under which they are able or unable to carry them out. The most obvious constraints are their own knowledge, their time, their other assignments, their materials and their support systems. These are all factors over which principals, schools of education, teacher accrediting agencies and other administrators can exercise control.

The next question to ask is, "What are the conditions that enable principals, administrators, schools of education and so on to provide teachers with what they need to get the job done, and what are the conditions that prevent them from doing so?" Answers to those questions move us farther and farther up the education hierarchy through state boards of education, departments of education, postsecondary governing boards, etc. and into the realm of laws and policies affecting the choices and degrees of freedom enjoyed by each of the many actors collaborating to make education work. This kind of "backward mapping" from the needs identified by NAEP data to the activities of each major actor and to the laws and policies affecting those actors is a strategy we cannot fully pursue in this short paper. But it is pursued somewhat in the next question, and future ECS reports will be devoted to more extended backward mapping.

"What new policy directions or guidelines are suggested by these findings?"

Since it appears that a concerted, relatively long-term policy focus upon disadvantaged youngsters, reading and elementary schools may well have affected achievement during the seventies, there is reason to hope that an even broader policy commitment could also lead to positive developments. The NAEP findings

suggest that such a policy might aim to:

- Continue the momentum gained during the seventies in helping disadvantaged students. Although they have made encouraging strides, they remain, as a group, below national levels of achievement.
- Focus more attention upon mathematics and science. This is already happening in many states; the important thing, however, is that the focus should be long-term.
- Redefine the goals of education as encompassing more than "basics" or minimum competencies. This could be done through reference not only to NAEP findings, but to the many social changes that are rendering earlier standards of literacy and achievement obsolete.
- Attend to the needs of the best students, as well as the poorest students.

What would such broad policy guidelines mean for the many actors in American education? Here are a few suggestions:

Federal Agencies

- The Department of Education can publicize the need to get beyond the basics if American education is to provide a work force capable of competing for world markets and a citizenry in tune with the "information age."
- The National Institute of Education can encourage research into the causes of erosion in the higher-level skills performance of top students (see questions raised below).
- The National Science Foundation can press for renewed attention to science and mathematics and research into the causes of declines in those areas.
- The U.S. Congress can pass legislation which creates incentives for the private sector to devote resources to the schools and create a closer partnership between business and education.

Governors

- Call attention to both the good and bad news in these findings through state-of-the-state addresses.
- Establish commissions to determine the extent to which these national trends match state trends, to recommend coordinated approaches to the higher-level skill problems and to redefine the state's educational goals and commitments.

- Encourage private sector support for innovative educational programs through speeches, state blue ribbon commissions and proposed legislation.

State Legislators

- View education expenditures as critical investments in the human capital that will attract business and industry to the state and insure a viable state economy.
- Create incentives for private sector support of schools and for a stronger postsecondary/secondary school partnership.
- Provide financial and other incentives for good teachers to stay in the schools.
- Provide tax and other incentives for educational software development, and help establish guidelines to insure appropriate and constructive use of educational technology.

State Departments of Education

- Review tests and assessments to establish the extent to which the state's trends mirror the national trends.
- Establish curricular guidelines dealing with:
 - The acquisition of inferential comprehension and a commitment to reading.
 - The use of writing in any subject area as a way of promoting analytical, interpretive and evaluative skills.
 - Methods of stimulating more student writing of many different kinds and discouraging overattention to sentence-level instruction.
 - Students' boredom with "dumbed down" books, their fear of writing, anxiety about mathematics and resistance to senior high school science programs.
 - The need to go beyond retelling in response to written material.
 - Word problems and problem-solving skills.
 - The integration of the calculator and computer into the mathematics curriculum.

- Scientific literacy for all students.
- Exercises, assignments, activities that challenge even the best students.
- Provide technical assistance to schools and districts, with particular attention to inservice training in the development of problem-solving teaching strategies.
- Assist textbook selection committees by providing achievement and research information and guidelines for evaluating the degree to which books offer sufficient interest and challenge to all students.
- Develop assessment and record-keeping systems to monitor statewide progress on both low-level and higher-level competencies.
- Institute reviews, through teacher licensing and certification boards, of the course work required of teachers. To the extent current requirements do not involve sufficient training in teaching higher-level skills or adequate content course coverage, revise the requirements.

State or District Textbook Selection Committees

- Solicit reviews of current textbooks to determine the degree to which their language, questions and associated workbooks are underchallenging students.
- Develop specifications for textbooks that:
 - Promote analysis, synthesis, interpretation and evaluation.
 - Have proven interesting to the full range of students who will be using them.
 - Encourage writing, experimentation and discussion.
 - Do not fragment subjects so much students cannot see the forest for the trees.
- Give as much attention to substantive research issues as to the sociopolitical issues surrounding textbooks.

State Postsecondary Governing Boards

- Institute reviews of postsecondary programs and courses to determine the extent to which they only continue to promote a "basics" approach to learning.

- Encourage new courses for teachers that equip them to deal with the full range of student needs and abilities, that emphasize content knowledge and that convey the fruits of teacher effectiveness research.
- Work with postsecondary institutions to more effectively use admissions requirements as a means of increasing student enrollment in mathematics, science and other college preparatory courses.
- Join with state boards of education to promote greater cooperation between postsecondary institutions and public and private schools in reshaping education to address new needs.

"What major research questions do these findings raise?"

These findings and many more in the rich NAEP data base raise a number of intriguing questions which can only be answered by deeper study, further data collection and a host of quite different research approaches. Some major questions that have occurred to people familiar with the data are these:

- Why are the performance patterns of 9-year-olds, 13-year-olds and 17-year-olds so different from one another? The youngest students seem to keep improving, but their improvements do not seem to register four years later when the cohort group is 13. Is this happening because:
 - Elementary schools, junior high schools and high schools are distinct arenas, and changes in the lower grades do not necessarily pass on to the higher grades?
 - Not enough time has elapsed for improvements made in the late seventies to show up yet among older students?
 - Instruction and materials in the elementary grades are sufficient to stimulate short-term gains, but do not lay firm enough foundations to support students when they are older?
- Why, exactly, did low achievers make the gains they did? We have argued in this paper that their needs were more heavily attended to than ever before and that they were the targets of many federal and state programs. That is only one hypothesis, however, and it would be stronger if we knew which particular aspects of those programs were most successful in helping low achievers. Of course, other factors could play strong roles in their achievement, such as improved health, a rise in the proportion of such children whose parents have graduated

from high school and so on.

- Why, exactly, has the high achievers' performance declined? Several hypotheses suggest themselves:
 - They were ignored or little attended to.
 - They took fewer academic courses and more electives.
 - The "basics"-oriented books and instructional approaches they were exposed to were unchallenging.
 - The foundation they were given in the early grades crumbled as they met greater demands in the higher grades.
- Why has performance on higher-level skills declined? Major testable hypotheses are:
 - They were not taught or practiced.
 - Students are taught specific, discrete skills, not general skills; concepts, not how to conceptualize; problem-solving algorithms, not problem-solving strategies.
 - Teachers do most of the hard thinking for the students, who are left to "fill in the blanks."
 - Pervasive multiple-choice testing of low-level skills has driven time and motivation for higher skills out of the classroom.

These are only a few of the research questions suggested by NAEP data; there are literally dozens more. The point in raising a few major research questions is simply to demonstrate one of the primary virtues of a broad, descriptive data base: it both answers and generates important questions for policy makers and researchers. National Assessment findings by themselves constitute facts that must be reckoned with in policy or research discussions. When coupled with other research findings and the judgments of experienced educators, NAEP data become formidable tools with which to analyze and explain the ups and downs of American education.

SIXTY-THREE FINDINGS IN FIVE LEARNING AREAS

National Assessments of Reading

Reading was assessed in the 1970-71, 1974-75 and 1979-80 school years. Each assessment included a wide range of passages and followup questions probing students' lower-level, literal comprehension skills and their higher-level, inferential comprehension skills. As in all national assessments, the materials used to measure change were identical in each assessment and had been kept secure. Stratified random national samples of 60,000 - 80,000 9-, 13- and 17-year-old students were assessed each year.

The reading reports in which the findings below are described fully are: Three National Assessments of Reading: Changes in Performance, 1970-80 (TNAR); Reading Comprehension of American Youth: Do They Understand What They Read? (RCA); "Students From Homes in Which English is Not the Dominant Language: Who Are They and How Well Do They Read?" (SFH); "Performance of Hispanic Students in Two National Assessments of Reading" (PHS). All are available through the Education Commission of the States Distribution Center, 300 Lincoln Tower, 1860 Lincoln Street, Denver, Colorado 80295.

Findings

1. Between 1971 and 1980, 9-year-olds' overall reading performance improved 3.9 percentage points. Groups that used to perform considerably below the national level improved their performance even more dramatically than the age group as a whole: blacks up 9.9 percentage points; southeasterners up 7.5; rural students up 6; and disadvantaged urban students up 5.2 percentage points (TNAR, pp. 7, 9). Hispanic students improved 5.3 percentage points between 1974 and 1980 (PHS, pp. 1, 5).
2. When the 9-year-olds' reading results are analyzed in terms of four levels of student achievement (from lowest to highest), it appears that all the improvement was in the bottom two achievement classes; students in the top two achievement classes performed at the same level throughout the decade (TNAR, p. 34).
3. The overall reading performance of 13-year-olds stayed the same through the seventies, although there was a slight improvement in literal comprehension skills (up 1.6 percentage points) (TNAR, p. 15).

4. Black 13-year-olds improved their overall reading performance 4.2 percentage points (TNAR, p. 17).
5. As at age 9, it is also the case that the bottom two achievement classes improved the most; however, the top achievement class dropped 2.4 percentage points (TNAR, p. 34).
6. Although the overall reading performance of 17-year-olds stayed the same through the seventies, their performance on inferential comprehension exercises declined by 2.1 percent (TNAR, p. 23).
7. There is no evidence at age 17 of the gains posted by disadvantaged youngsters at the earlier ages. For instance, 9-year-old blacks closed the gap between themselves and the nation by about 6 points; 13-year-olds closed it by a little over 3 points; but 17-year-old blacks made no comparable gains over the decade.
8. Of the four achievement groups, it is the top group -- the highest achievers -- who are declining most at age 17 in their overall reading performance (TNAR, p. 35).
9. The top two achievement groups exhibit the greatest declines in inferential comprehension over the decade: 4 percentage points (TNAR, p. 37).
10. Students from homes in which English is not the dominant language perform considerably below students for whom English is the dominant language on reading assessments. At age 9, the difference between them is 15 percentage points; at age 13, it is 12 percentage points; and at age 17, it is 8 percentage points (SFH, pp. 6, 20).
11. Some other language dominant (OL) students perform above the nation, particularly those attending advantaged urban schools and those coming from homes with many reading resources (SFH, pp. 7, 20, 21).
12. The gap between white OL students and the nation shrinks from age 9 to age 13 to age 17. The gap between Hispanic OL students and the nation remains much the same at ages 9, 13 and 17 (SFH, p. 6).
13. Seventeen-year-old students who had not been assigned homework the day before the assessment (31.5 percent of the total) performed 4.7 points below the nation on reading comprehension exercises. Those who reported doing more than 2 hours of homework (9.3 percent)

performed 5.1 percentage points above the nation (RCA, p. 6).

National Assessments of Writing

Writing was assessed in the 1969-70, 1973-74 and 1978-79 school years. Except for background questions about attitudes, courses taken and so on, the writing assessments use no multiple-choice measures of writing. They are based entirely on essays, letters and other such tasks, which are scored qualitatively, using holistic and primary trait approaches, and are described quantitatively in terms of such things as mechanics, syntax or coherence.

The writing reports in which the following findings are detailed are: Writing Achievement, 1969-70: Results from the Third National Writing Assessment: Volume I, 17-year-olds (VI), Volume II, 13-year-olds (V2) and Volume III, 9-year-olds (V3). All are available through the Education Commission of the States Distribution Center.

Findings

14. Between 1970 and 1979, the percentage of 9-year-olds' expressive essays rated 3 or 4 on a 4 point scale rose 6 percentage points. The percentage of quality narratives declined, while the percentage of good or excellent persuasive writing tasks stayed the same over the decade (V3, pp. 13, 16, 27, 32).
15. Between 1969 and 1978, there was a decline in the quality of 13-year-olds' descriptive essays, most of it taking place between 1969 and 1973. Thirteen-year-olds also showed declines in persuasive writing and in the coherence of their essays (V2, pp. 15, 16, 32).
16. Between 1969 and 1979, 17-year-olds' descriptive and explanatory writing performance did not change. However, their performance on persuasive writing tasks declined between 1974 and 1979 from 21 percent writing good papers to 15 percent (V1, pp. 12, 14, 20, 26, 31).
17. On most writing exercises, black students either improved at a faster rate than all students or stayed at the same level, while all students declined.
18. Error analysis of thousands of essays written in 1969-70, 1973-74 and 1978-79 reveals no real changes in the commission of such common errors as sentence fragments, run-on sentences, capitalization, punctuation, agreement or spelling. That is, students at all three ages continued to make about the same number of mistakes in

their first draft writing, on average throughout the decade (V1, pp. 42-46; V2, pp. 40-43; V3, pp. 40-43).

19. Analyses of the fluency and maturity of students' writing did not reveal any changes over the decade for the teenagers, although there were some slight changes for 9-year-olds (V1, pp. 40-42; V2, pp. 37-39; V3, pp. 37-40).
20. At all three ages, a sizeable proportion of young people -- 10 to 25 percent -- display very serious problems with writing (V1, p. 52; V2, p. 48; V3, p. 48).
21. At all three ages, about 20 to 25 percent of the students are fearful about writing, have a sense of doom about it and avoid it whenever they can (V1, pp. 142-143; V2, pp. 124-125; V3, pp. 44-45).
22. One-third of the 17-year-olds are doing some writing across all their courses -- at least one paper a week (V1, pp. 48-49).
23. Two-thirds of the 17-year-olds are not doing any appreciable writing in their classes (V1, pp. 48-49).
24. Eighty percent of the 17-year-olds spend a third or less of their English class time studying writing (V1, p. 48).
25. Sixty percent of the 17-year-olds get neither written suggestions back from the teacher on their papers nor discussions with the teacher about their work (V1, p. 49).
26. Only seven percent of the 17-year-olds appear to be receiving comprehensive writing training, i.e., training in prewriting, practice in improving papers and experience in getting good feedback from their teachers (V1, p. 49).

National Assessments of Literature

There have been two national literature assessments, the first in 1970-71 and the second in 1979-80, when literature was combined with reading. Much of the literature assessment involved asking students to respond in writing to various kinds of literature. The findings below are all discussed in detail in Reading, Thinking and Writing (RTW). Findings 27-29 are also discussed in Reading Comprehension of American Youth (RCA). Both are available through the Education Commission of the States Distribution Center.

Findings

27. When reading on their own, most teenagers read for less than one hour (RTW, p. 7; RCA, p. 5).
28. Most teenagers do no homework or less than one hour per night (RTW, p. 8; RCA, p. 6).
29. Most teenagers watch television for more than one hour per night: half the 13-year-olds watch three hours or more, as do one-third of the 17-year-olds (RTW, p. 8; RCA, p. 4).
30. More than a quarter of the teenagers say it is usually hard for them to finish a book they have started (RTW, p. 9).
31. One-third of the teenagers say it is hard keeping their minds on reading (RTW, p. 9).
32. Forty to fifty percent of the teenagers say it is hard for them to read materials with "new words" (RTW, p. 9).
33. One-third of the teenagers have problems finishing classroom silent reading (RTW, p. 9).
34. One-third of the teenagers say they have trouble finishing "long books" (RTW, p. 9).
35. When asked to respond to literary works and explain their response in writing by analyzing the work, very few teenagers demonstrated strong analytic skills. In fact, only five to 10 percent of them did so. Another 35 to 50 percent showed they had an inkling of what to do; 25 to 40 percent tended to "retell" the work (summarize the plot or main idea); and 10 to 15 percent proved unable to do it at all (RTW, pp. 15-24).
36. The percentage of 17-year-olds writing adequate analyses to substantiate their opinions about the mood of a literary work declined 10 percentage points between 1971 and 1980 (RTW, p. 23).
37. When asked to discuss theme and main idea of literary passages, students tended most frequently to retell the story or poem (RTW, pp. 33-46).
38. Students' written responses to literary works are heavily influenced by the work. If the character and situations are close to the students' experience, they respond with a personal analysis, for instance. However, their personal responses were usually undeveloped, unsupported

and rather notional (e.g., "he shouldn't have said that to his father," etc.). And, over the seventies, the students became even more notional and judgmental (RTW, pp. 25-46).

39. Thirteen-year-olds tended to move away from retelling responses and more toward superficial evaluations and unsupported judgments (RTW, pp. 33-46).
40. Seventeen-year-olds tended to move away from responses based upon inferential leaps (right or wrong) and more toward "egocentric" responses (in which they talk mainly about themselves instead of the work) and superficial evaluations (RTW, pp. 33-46).

National Assessments of Mathematics

The first two mathematics assessments were in 1972-74 and 1977-78. Results from the third assessment (1981-82) will be reported in early 1983. The mathematics assessments involved a broad range of exercises assessing all aspects of the elementary and secondary mathematics curriculum except higher algebra, trigonometry or calculus.

The results mentioned below come from the following reports: Changes in Mathematical Achievement, 1973-78 (CMA); Mathematical Knowledge and Skill (MKS); Mathematical Application (MA); Mathematical Understanding (MU); Reading, Science and Mathematics Trends: A Closer Look (RSM); Mathematics Technical Report: Summary Volume (MTR); and Results from the Second Mathematics Assessment of the National Assessment of Educational Progress, published by the National Council of Teachers of Mathematics (NCTM). All but the last report are available through the Education Commission of the States Distribution Center.

Findings

41. The overall mathematics performance of 9-year-olds did not decline significantly between 1973 and 1978 (CMA, p. 1).
42. The overall mathematics performance of 13-year-olds declined 2 percentage points (CMA, p. 1).
43. The overall mathematics performance of 17-year-olds declined 3.6 percentage points (CMA, p. 1).
44. At all three ages, performance on knowledge exercises stayed the same or declined very slightly, but performance on problem-solving exercises declined dramatically: 5.9 percentage points at age 9; 3.4 points

- at 11; and 4.0 points at age 17. In skills, 13-year-olds declined 2.0 percentage points and 17-year-olds declined 5.0 points (CMA, pp. 12-16; MA, pp. 1-25).
45. In spite of declines, most students at all three ages demonstrated a high level of mastery of computational skills, especially those involving whole numbers. However, majorities at all three ages demonstrated weaknesses in such areas as geometry, measurement and probability (MA, pp. 13-20).
 46. While other groups of 9- and 13-year-old students were showing declines in performance, black young people were not. Black 9-year-olds' overall performance improved 3 points and black 13-year-olds' overall performance remained stable (CMA, pp. 18-22).
 47. At all three ages, the highest achievement class declined 3 to 4.3 points, while the lowest achievers did not decline at all (RSM, forthcoming).
 48. Over 85 percent of the 17-year-olds in the assessment said they had access to a calculator. Results indicate that only half of the students are reasonably proficient in division as they near high school graduation. However, over 50 percent of the 9-year-olds and 90 percent of the 17-year-olds could do long division correctly with a calculator (MTR, pp. 120-135).
 49. Teenagers rated mathematics as the most important of their school subjects (NCTM, p. 133).
 50. Nine-year-olds rated mathematics as the best liked of five academic subjects; 13-year-olds rated it as the second best liked subject; and 17-year-olds rated it as the least liked subject (NCTM, p. 134).
 51. Thirteen-year-olds said mathematics was the easiest of their academic subjects, but 17-year-olds rated it as the hardest (NCTM, p. 139, 140).
 52. Over half the students at all three ages thought they were good at mathematics and said they enjoyed the subject (NCTM, p. 139, 140).
 53. A large majority of students at all ages felt that a knowledge of mathematics was important in order to get a "good" job (NCTM, p. 141).
 54. Students perceive their role in the mathematics classroom to be primarily passive. They feel they are supposed to sit and listen and watch the teacher work problems, then spend their remaining time working out problems alone.

They have little opportunity to interact with their classmates or take on exploratory projects (NCTM, p. 136).

National Assessments of Science

Science was assessed in the 1969-70, 1972-73 and 1976-77 school years. Changes in science achievement are based upon the responses of 17,000 to 29,000 respondents of each age to 70-92 exercises covering both the physical and biological sciences. The science findings are detailed in Three National Assessments of Science: Changes in Achievement, 1969-77 (TNA); Reading, Science and Mathematics Trends: A Closer Look (RSM); and Attitudes Toward Science (ATS). All are available through the Education Commission of the States Distribution Center.

55. Nine-year-olds declined on physical sciences exercises from 1969-77. However, they improved their performance on biology exercises between 1973 and 1977 (TNA, pp. 6-9).
56. Thirteen-year-olds followed the same pattern as 9-year-olds: a decline in physical sciences and an improvement, between 1972 and 1976, in biology (TNA, pp. 6-10).
57. Seventeen-year-olds declined in both the physical and biological sciences (TNA, pp. 6-11).
58. Declines in science were greatest among the highest achievers, especially white high achievers at ages 9 and 13 (RSM, forthcoming).
59. Teenagers list science as their fourth favorite course, behind mathematics, English and social studies (ATS, p. 5).
60. Forty-four percent of the 13-year-olds and 37 percent of the 17-year-olds say they always or often like their science classes (ATS, p. 6).
61. Eighty-one percent of the 17-year-olds said their science teacher "really likes science;" 48 percent said the teacher makes science exciting (ATS, p. 8).
62. About half the teenagers say they are interested in scientific careers (ATS, p. 12).
63. About a quarter of the teenagers think a scientific education for a career would cost too much (ATS, p. 15).

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